

AutoMoe

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Background



NSC Motor Vehicle Fatality Estimates Prepared by the Statistics Department National Safety Council

Table 1 December 2016 **Motor-Vehicle Deaths and Changes** United States, Twelve Months, 2013 to 2016*

	Number of Deaths				Percent Changes				
								Four Mon	th Moving
					Corresponding Month Avera			age +	
	1				2014 to	2014 to	2015 to	2014 to	2015 to
Month	2013	2014	2015	2016	2016	2015	2016	2015	2016
January	2,642	2,572	2,754	2,740	7%		-1%		3%
February	2,296	2,248	2,350	2,880	28%		23%		6%
March	2,791	2,589	2,764	3,070	19%		11%		9%
April	2,719	2,720	2,830	3,170	17%		12%		11%
May	2,988	3,038	3,339	3,520	16%		5%		12%
June	3,181	3,084	3,222	3,550	15%		10%		10%
July	3,119	3,227	3,530	3,560	10%		1%		7%
August	3,378	3,277	3,642	3,740	14%		3%		5%
September	3,184	3,069	3,372	3,560	16%		6%		5%
October	3,173	3,304	3,550	3,790	15%		7%		4%
November	3,076	3,175	3,159	3,480	10%		10%		6%
December	2,822	3,095	3,245	3,140	1%		-3%		5%
TOTAL	35,369	35,398	37,757	40,200	14%		6%		

Current State of the Art

Currently, many new vehicles have some level 1 & level 2 automation features such as:

- **1. Level 1**
 - a. Cruise Control
 - b. Obstruction warning
 - c. Parallel parking
- 2. Level 2
 - Automated lane guidance
 - Driver fatigue detection



Levels of Autonomous Vehicles (AV)

Level 0: Functionality is completely controlled by the human driver

Level 1: Automation of 1 function (e.g cruise control)

Level 2: Simultaneous automation of more than 1 function (e.g., navigation and deceleration); however, the human driver must remain engaged

Level 3: Functionality of the vehicle is satisfactorily automated to afford engagement of other activities by the driver.

Level 4: Complete automation, that is, there is no need for a human driver

Current State of the Art (cont.)

Level 3

• Human emergency fail-safe

Level 4

• Full automation/No Driver needed



Customer needs :

A 2008 survey by the US National Highway Traffic Safety Administration found that human error is the critical reason for 93% of crashes

When you eliminate human error, our roads become dramatically safe, no more:

- Drunk-driving
- Phone calls at the wheel
- Carelessness/inattention
- Bad driving.

Design Requirements

Product Dimensions: 12.5 x 8 x 7.5 inches

Weight: 3.5 lbs

Voltage Consumption: 23V

Current Consumption: 20mA



Constraints/Comply Standards

- Compliance with IEEE Standard 11-2000: A standard for rotating electric machinery for rail and road vehicles
- Compliance with all US Department of Transportation's Federal Motor Vehicle Safety Standards and Regulations
- Abide by Arduino's Terms of Use









Design Features

- Slow down
- If the vehicle is going straight, turn in the direction closest to our waypoint (more specifically, closest to the course to our waypoint).
- If the vehicle is already turning, then turn in the opposite direction to try to avoid the object.
- If we get within a definable distance of the object, stop, backup, and try again.

Pros/Cons

Pros		Cons		
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Questions & Concerns?





Sources:

http://jdasolutions.aero/blog/wp-content/uploads/2016/08/Air-Traffic-Controller2.jpg

https://spectrum.ieee.org/cars-that-think/transportation/self-driving/do-selfdriving-cars-need-night-vision

http://www.behind-the-scenes.co.za/433mhz-rf-communication-from-a-raspberry-pi/

http://play-trains.com/wp-content/uploads/2015/08/Brio-Deluxe-Railway.jpg

https://i.kinja-img.com/gawker-media/image/upload/s--DyHFOjQ3--/c_scale.fl_progressive.g_80,w_800/tmpdnsytzmvpa6cz9meu.jpg

https://i.ytimg.com/vi/dS-wv6uptyQ/maxresdefault.jpg

https://arduino-info.wikispaces.com/Ultrasonic+Distance+Sensor+Applications

